A new Australian larval Callidosomatine Mite (Acarina: Erythraeidae) parasitic on Flies, with Notes on Subfamily and Tribe Classification

R. V. SOUTHCOTT

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A revised key to the genera of larval Callidosomatini is given, and formal definitions of the tribal names Callidosomatini and Charletoniini.

R. V. Southcott, 2 Taylors Road, Mitcham, Australia 5062; manuscript received 24 February, 1987, accepted for publication 25 August 1987.

INTRODUCTION

The subfamily Callidosomatinae was introduced by Southcott (1957), and later (Southcott, 1961b) divided into the tribes Callidosomatini and Charletoniini, in keys, but hitherto without formal text definitions for the tribes.

Southcott (1972) left the Callidosomatini with three genera known as larvae: *Caeculisoma* Berlese, 1888, *Callidosoma* Womersley, 1936 and *Momorangia* Southcott, 1972. In this paper a further genus of Callidosomatini is described, from larvae captured ectoparasitic on flies in New South Wales, *Carastrum ferrari* n. gen., n. sp.

Abbreviations for scutal dimensions are as in Southcott (1966, 1972), and for leg segmental dimensions as in Southcott (1986). Seta coding terminology follows Southcott (1961b,c, 1966, 1972).

All measurements are in micrometres (μm) unless otherwise indicated.

SYSTEMATICS

Tribe CALLIDOSOMATINI Southcott

Callidosominae Southcott, 1957, p. 97.
Callidosomatinae Southcott, 1961b, p. 521.
Callidosomini Southcott, 1961b, p. 522.
Callidosomatini Southcott, 1972, p. 1.

Diagnosis

Adults: Callidosomatinae with usually distal tubercles on pedal tibiae.

Larvae: Callidosomatinae with scutalae 3+3 or more. Pedocoxalae 1, 2, 2. Pedotrochanteralae 1, 1, 1. Posterior pedotibial claw hooklike. Palpal tibial claw (odontus) without accessory peg or basal process.

Type genus *Callidosoma* Womersley, 1936.

Comment: The tribe Callidosomatini was based primarily on the characters of the adults (and deutonymphs), these being generally mites with short, thick legs with prominent distal tubercles.

Since then Sharma, Farrier and Drooz (1983) have described the adult and deutonymphal instars of *Callidosoma metzi* Sharma, Drooz and Treat, 1983 from North

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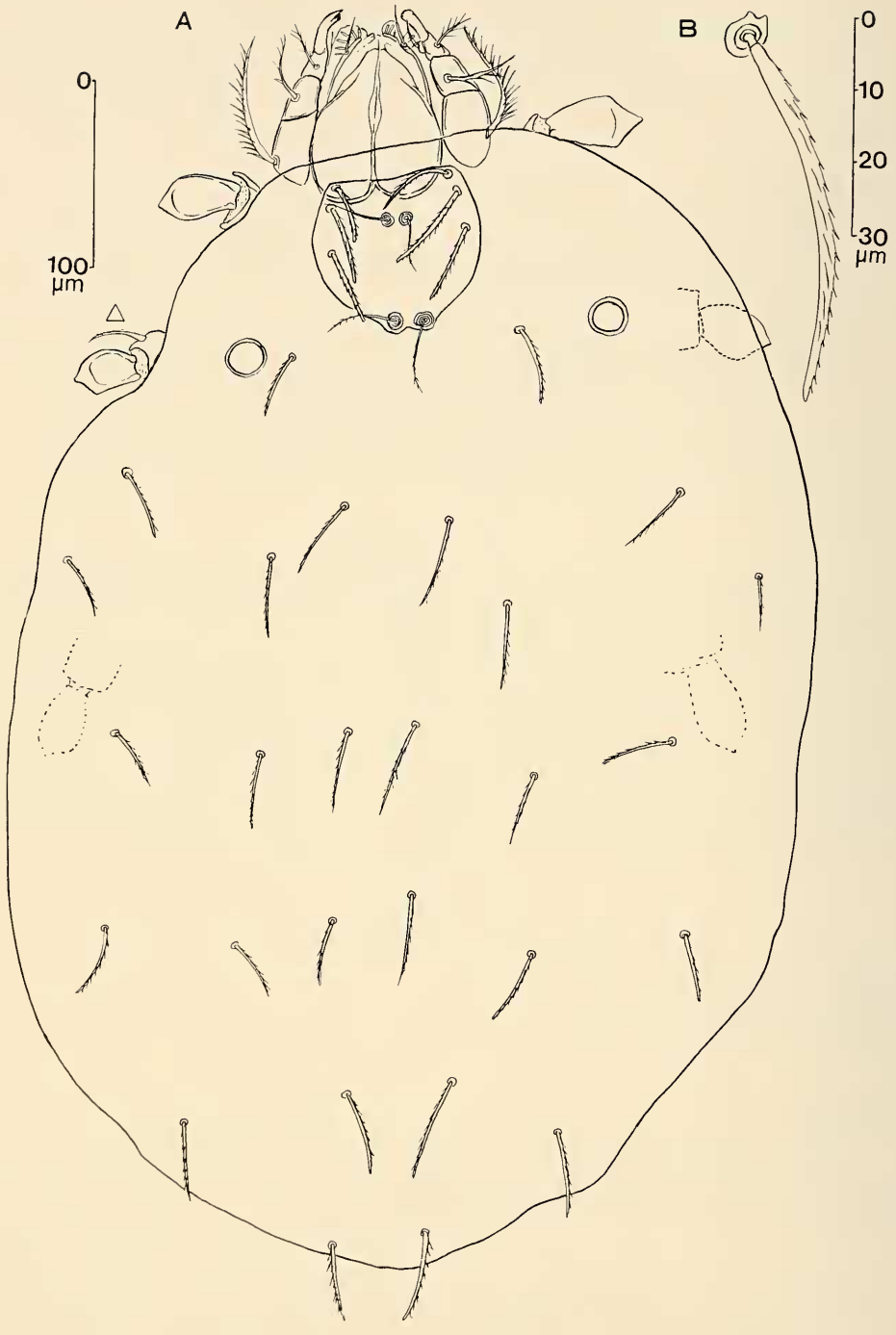
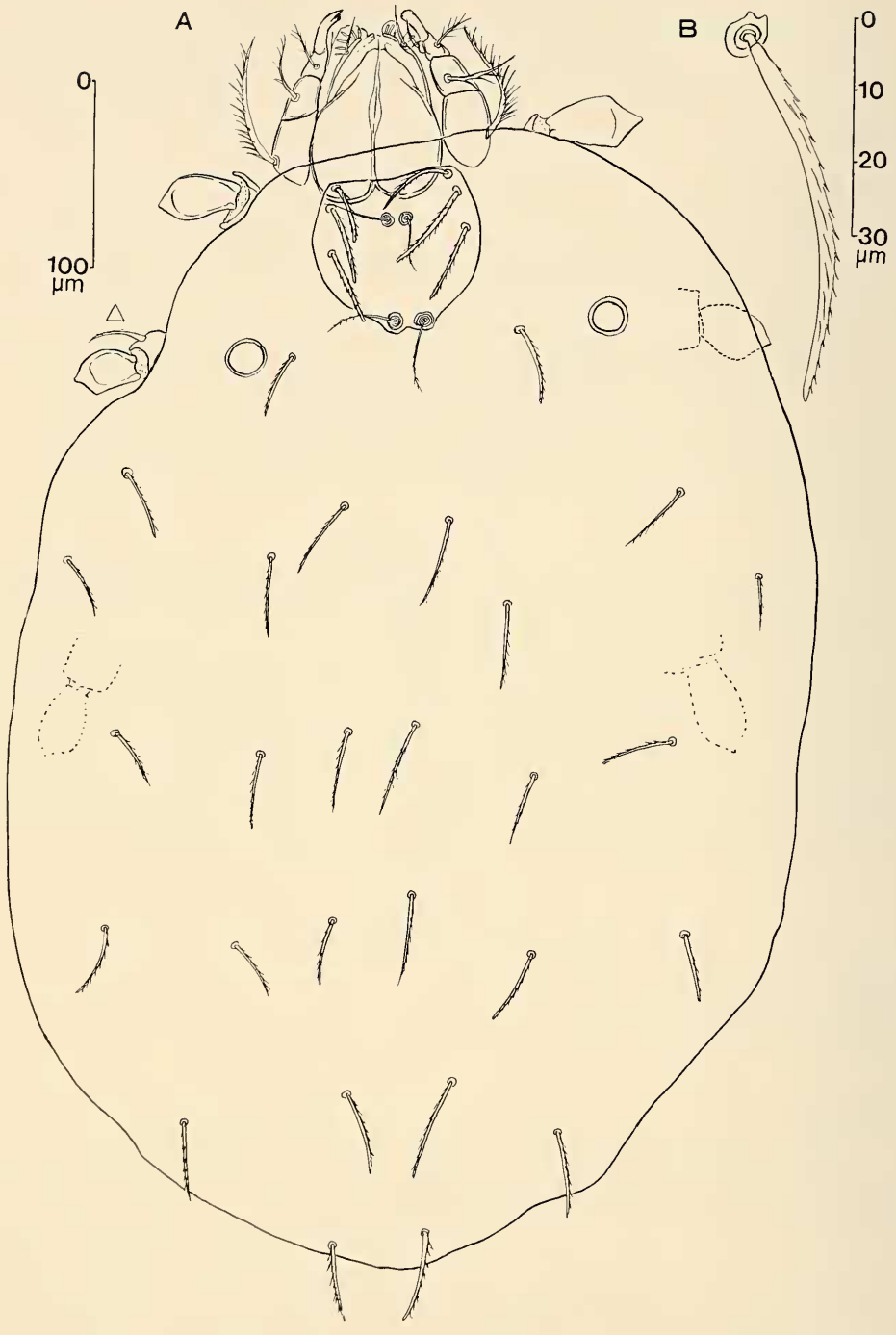


Fig. 1. Carastrum ferrari n. gen., n. sp. **A**, Dorsal view of Holotype larva, partly in transparency, with legs omitted beyond trochanters. **B**, Dorsal idiosomal seta ('ocular'), from Paratype ACA1892B. (Both figures to nearer scale.)



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See also the comment after the definition of Charletoniini, below.

Key to genera of larval Callidosomatini

1. Scutalae 4+4 or more ..... *Momorangia* Southcott
   Scutalae 3+3 2
2. Palpal tibial claw with 4-5 terminal teeth ..... *Carastrum* n. gen.
   Palpal tibial claw with two prongs 3
3. Anterior scutal sensilla not posterior to level of ML scutalae ..... *Callidosoma* Womersley
   Anterior scutal sensilla posterior to level of ML scutalae .. *Caeculisoma* Berlese.

Carastrum n. gen.

Etymology: The name *Carastrum* is derived from the *Ca-* of Callidosomatini, and Latin *rastrum*, a rake, referring to the structure of the palpal tibial claw.

Diagnosis (based upon larval characters): Callidosomatini with scutalae 3+3. Palpal tibial claw with 4-5 terminal teeth. All tarsal claws hooklike, the posterior with three large ventral setules. Pedotibia II with a large solenoidala.

Type species *Carastrum ferrari* n. sp.

Carastrum ferrari n. sp.
Figs 1 **A,B**, 2**A-C**, 3, 4**A-H**, 5, 6

Etymology: The specific name is in honour of the collector.

Material examined (larvae only; adults and deutonymphs not known): **Holotype** with label ACA1892G2, parasitic on fly A2808, 2 miles [3.2 km] W of Durras (north of Batemans Bay), New South Wales, 14.ii.1972, P. Ferrar.

Paratypes: Nine other specimens, same locality, date and collector, on flies *Pyrellia tasmaniae* Macquart, *Helina* sp., and undetermined calyptrates. Mites labelled ACA1892A-F, G1, H1, H2, on flies A2802-8, 2809, 2809 respectively.

All mites deposited in South Australian Museum collection; host Diptera in Australian National Insect Collection, Canberra.

Description of Holotype (supplemented by paratypes): Colour red. Ovoid, flattened below, with some grooves of idiosoma extending to lateral outlines. Length of idiosoma in ethanol 585, width 415, overall length including mouthparts 640; after mounting through lactic acid-Hoyer's medium length 610, width 440, overall length 675.

Dorsal scutum rounded, with shallow concave anterior margin, convex lateral margins except immediately before the protrusions for the posterior sensilla, with a notch between. Anterolateral angles rounded. Scutalae normal, curved, tapering, slightly blunted, with strong setules; AL at AL angles of shield, ML a little behind and lateral to them, PL further lateral but anterior to mid-level of shield. Scutal sensillary setae filiform, tapering, with a few distal setules.

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TABLE 1

Standard Data of three specimens of Carastrum ferrari

	ACA1892G2 Holotype	ACA1892A Paratype	ACA1892B Paratype
AW	61	59	57
MW	66	69	66
PW	71	73	71
SBa	11	10	9
SBp	15	14	14
ASBa	23	25	26
ISD	55	55	56
L	85	86	89
W	80	90	88
A-M	11	14	15
A-P	31	35	35
AL	55	49	58
ML	55	58	55
PL	52	47	48
ASens	45	45	42
PSens	69	66	67
ASBa/ISD	0.42	0.45	0.46
DS	46-53	45-49	46-55
Oc.	46	–	47
MDS	46	45	55
PDS	53	49	46
GeI	91	87	87
TiI	109	112	112
TaI(L)	98	113	109
TaI(H)	19	19	19
GeII	80	77	82
TiII	93	102	108
TaII(L)	107	104	107
TaII(H)	19	18	19
GeIII	83	82	87
TiIII	160	155	157
TaIII(L)	115	114	120
TaIII(H)	19	17	17

The Standard Data of the Holotype and two Paratypes are as in Table 1.

Eyes 1+1, posterolateral to scutum, corneae circular, width 18.

Dorsum of idiosoma with 28 setae, curved, slightly tapering, blunt-pointed, with strong setules; arranged 2 (oculars), 4, 4, 6, 6, 4, 2.

Venter: sternalae I robust, tapering, pointed, well setulose, 45 long; sternalae II similar, 53; sternalae III similar, 53. Behind coxae III 14 similar setae, arranged 4, 4, 4, 2; 29-45 long, the more posterior shorter and tending to resemble posterior dorsal idiosomalae.

Coxalae 1, 2, 2; coxala I tapering, pointed, well setulose, 76; lateral coxala II similar, 48, medial coxala II similar, 75; lateral coxala III similar, 50; medial coxala III similar, 60.

Legs of normal callidosomatine build. Specialized setae (from ACA1892B): Genu I with SoGeI.81d(20 long), VsGeI.87pd(5). Tibia I with Cp.61d(6) + SōTiI.62d(20) ('duplex pair'), SōTiI.69d(27), VsTiI.84pd(5). (Most distal seta of tibia I is ScTiI.83v(22)). Tarsus I with SōTaI.35d(27), SoFaI.51d(2). Genu II with VsGeII.87pd(5). Tibia II with SōTiII.09d(31). Tarsus II with SōTaII.45d(24). Tibia III with greatly enlarged solenoidala SōTiIII.04d(66). Pretarsal formula 1, 1, 1.

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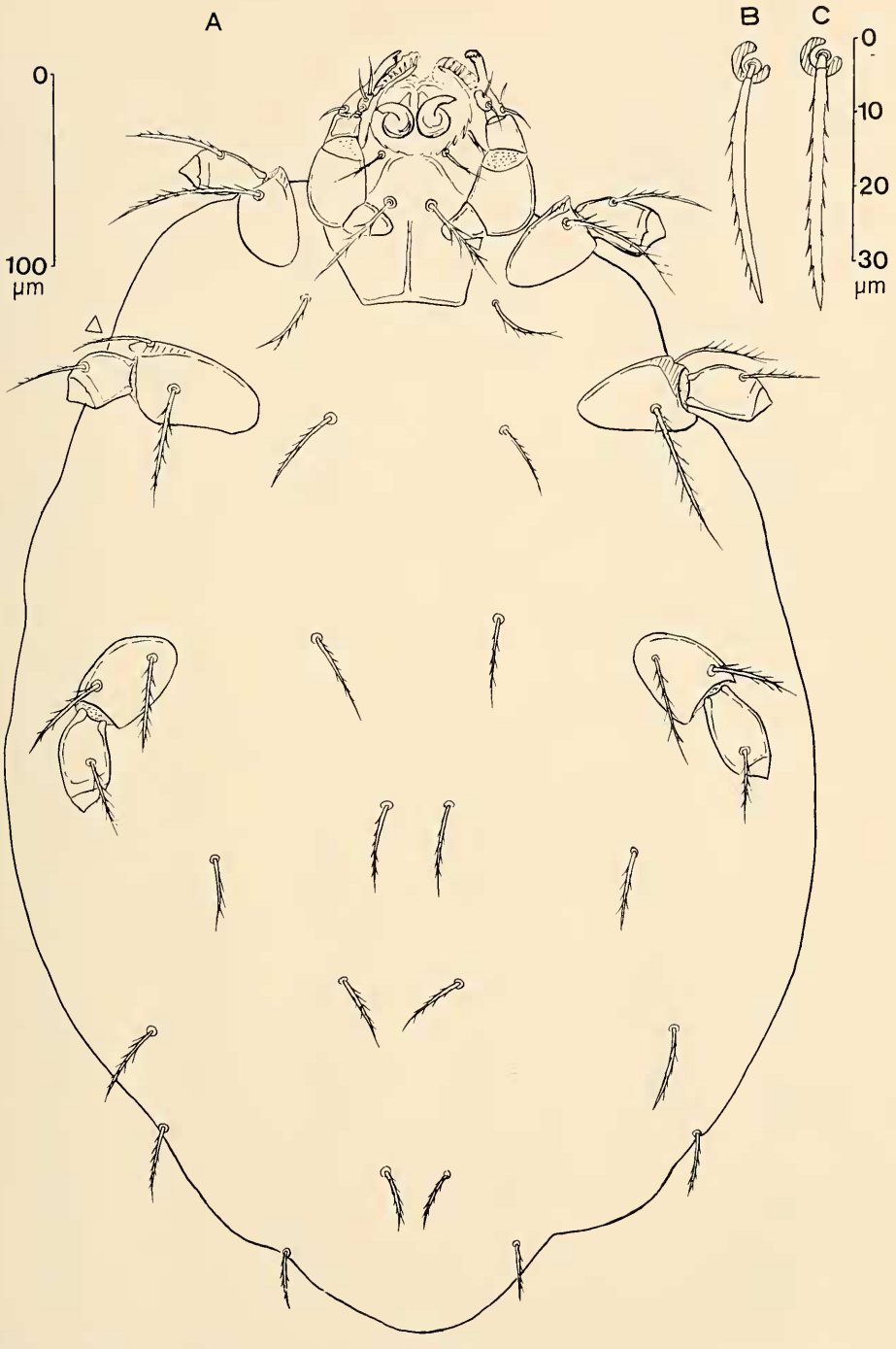
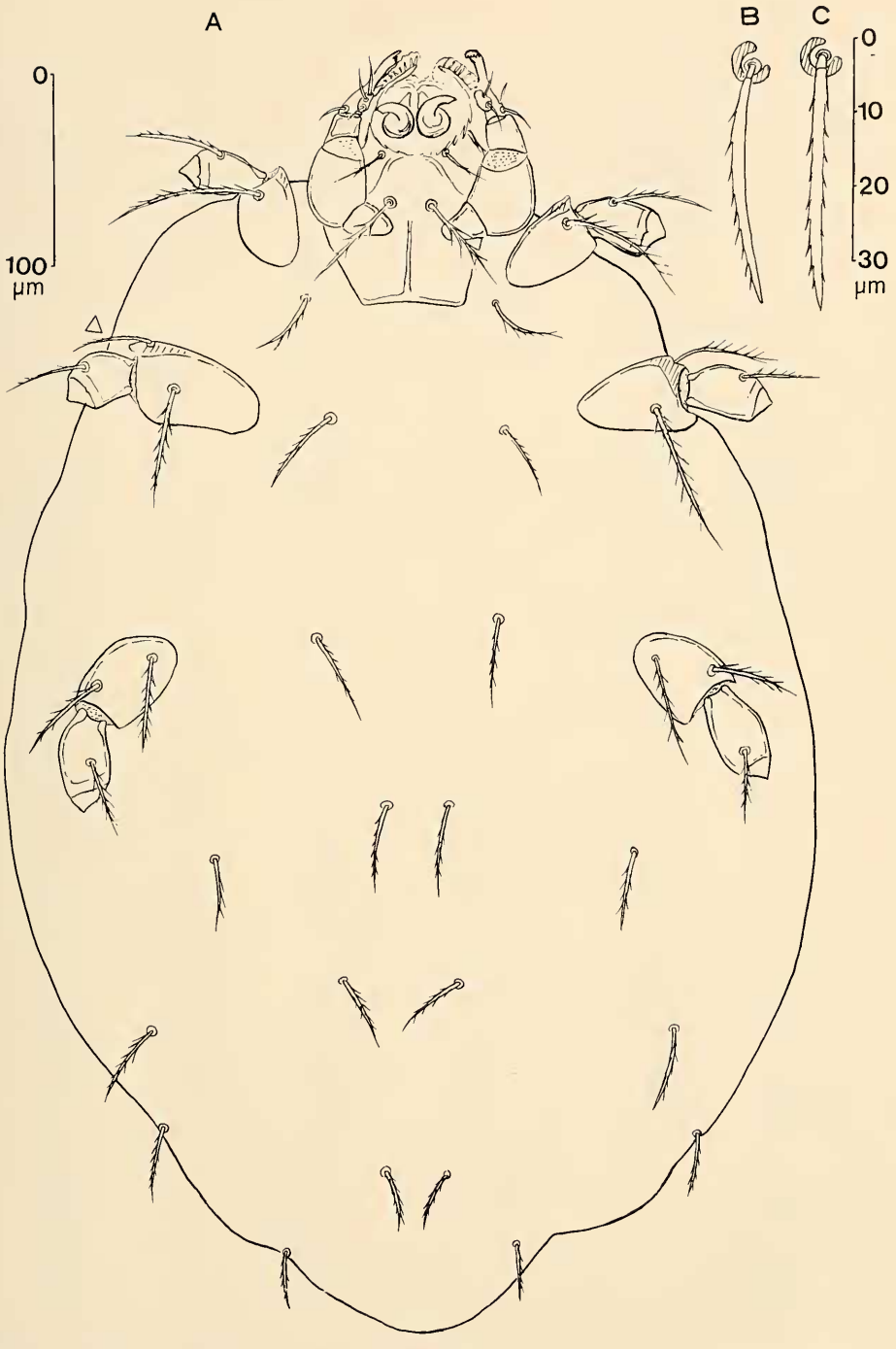


Fig. 2. Carastrum ferrari n. gen., n. sp. **A**, Ventral view of Holotype larva, with legs omitted beyond trochanters. **B, C**, Posterior ventral setae of idiosoma, from Paratype ACA1892B. (All figures to nearest scale.)



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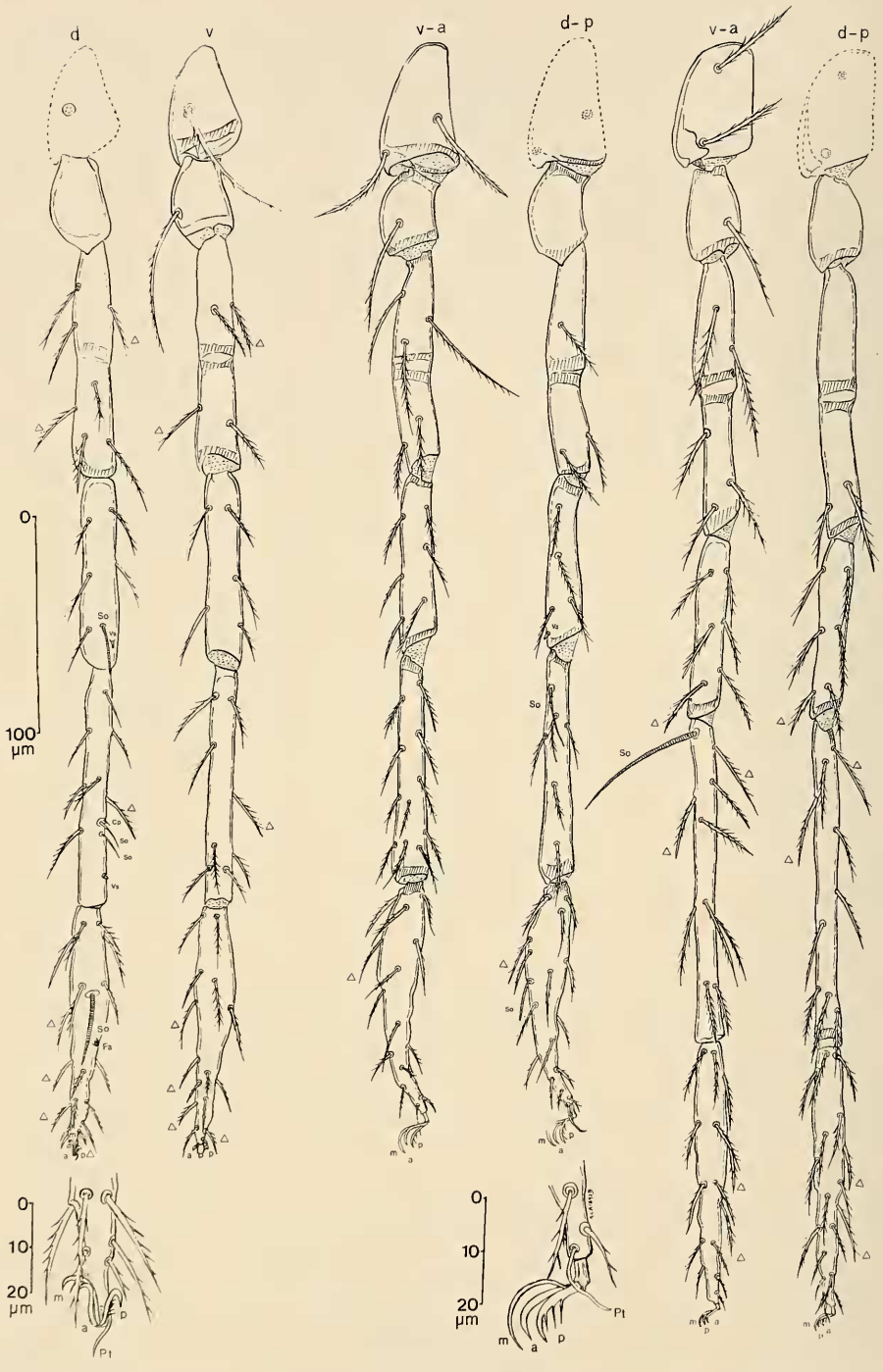
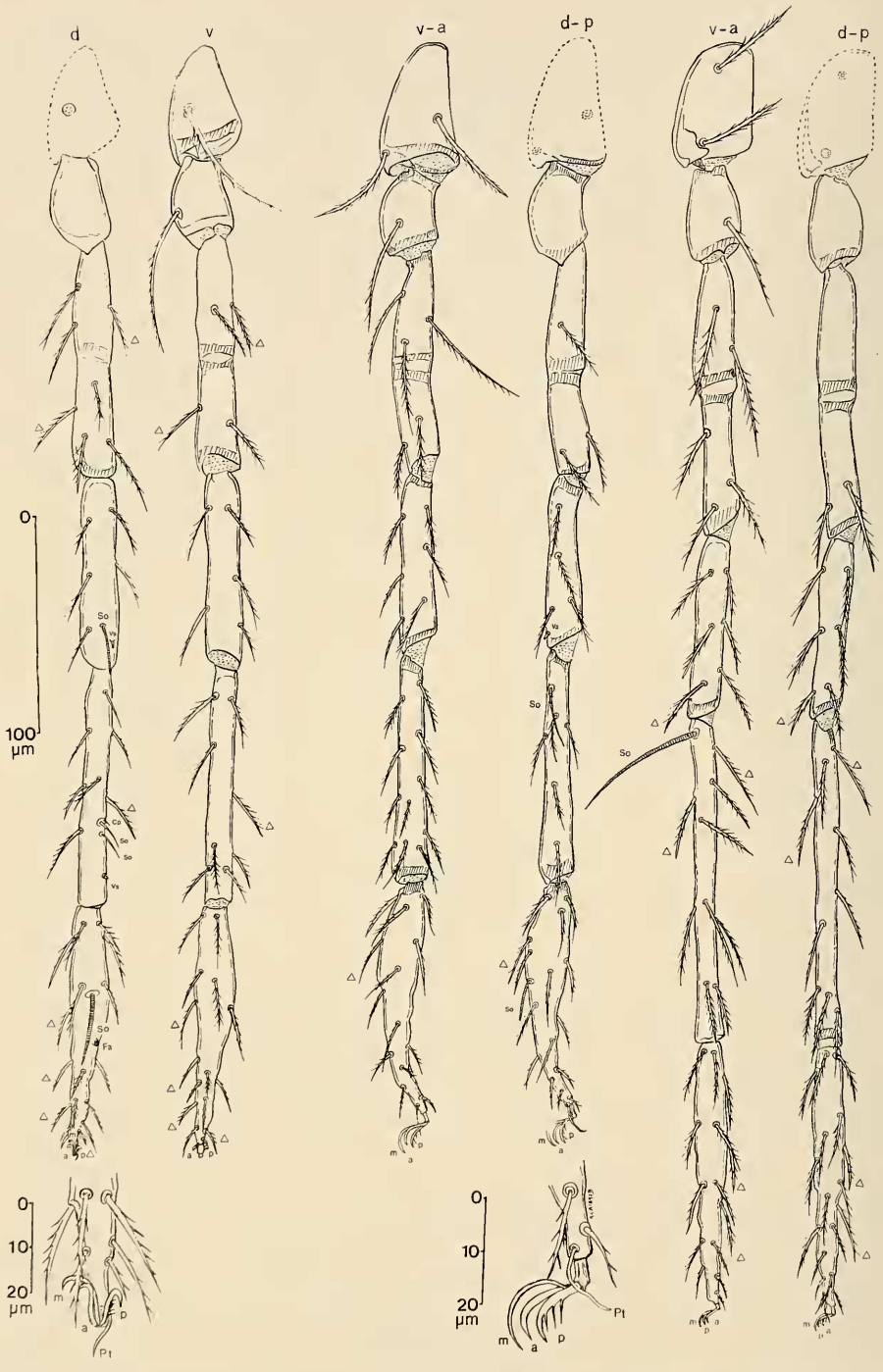


Fig. 3. Carastrum ferrari n. gen., n. sp., larva. Legs I, II, III of Paratype larva ACA1892B, to standard symbols; to scale on left. Inset: Tips of tarsi I and II, to scales alongside: I dorsal aspect, II posterior aspect; Pt pretarsala.



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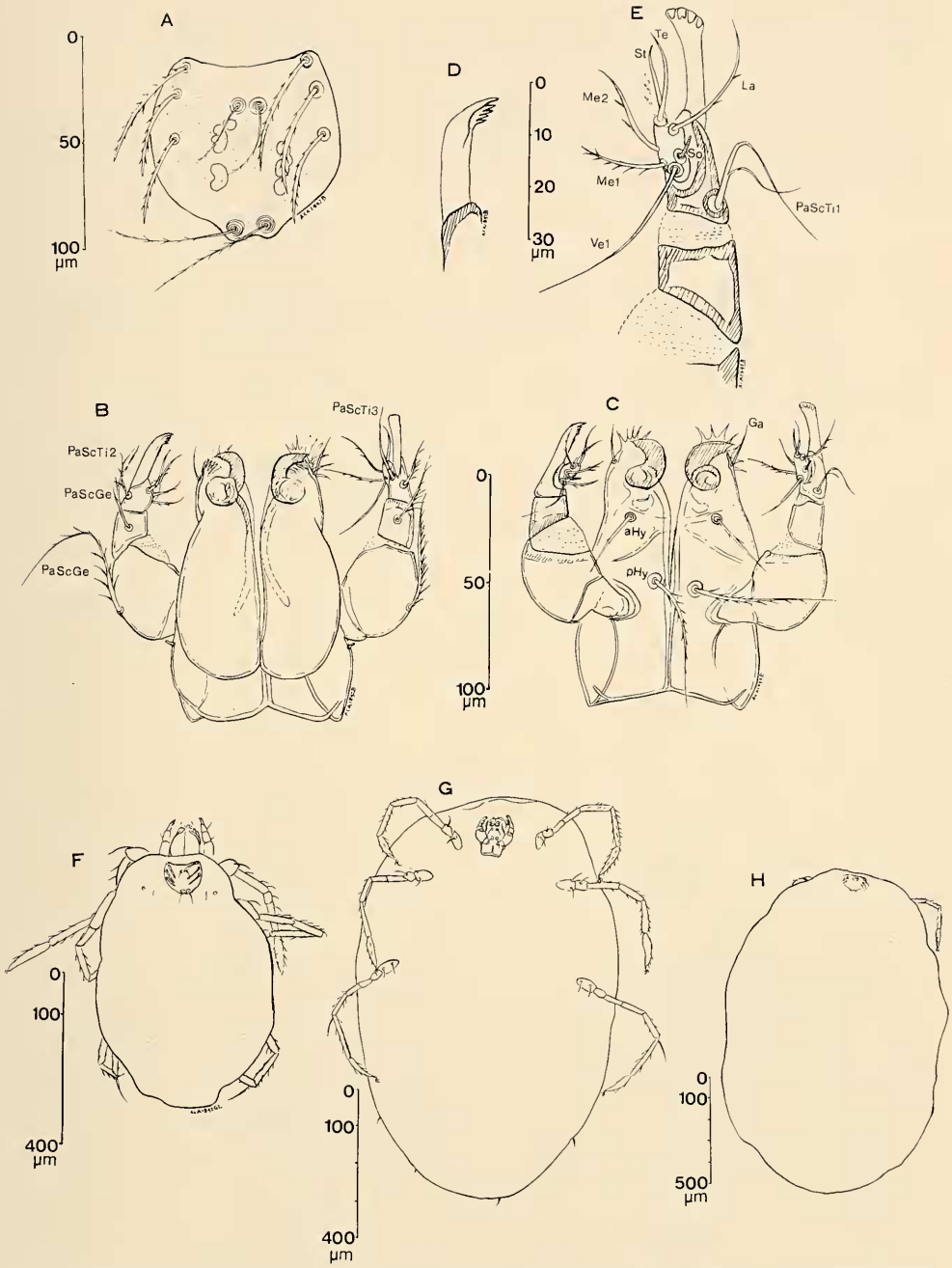
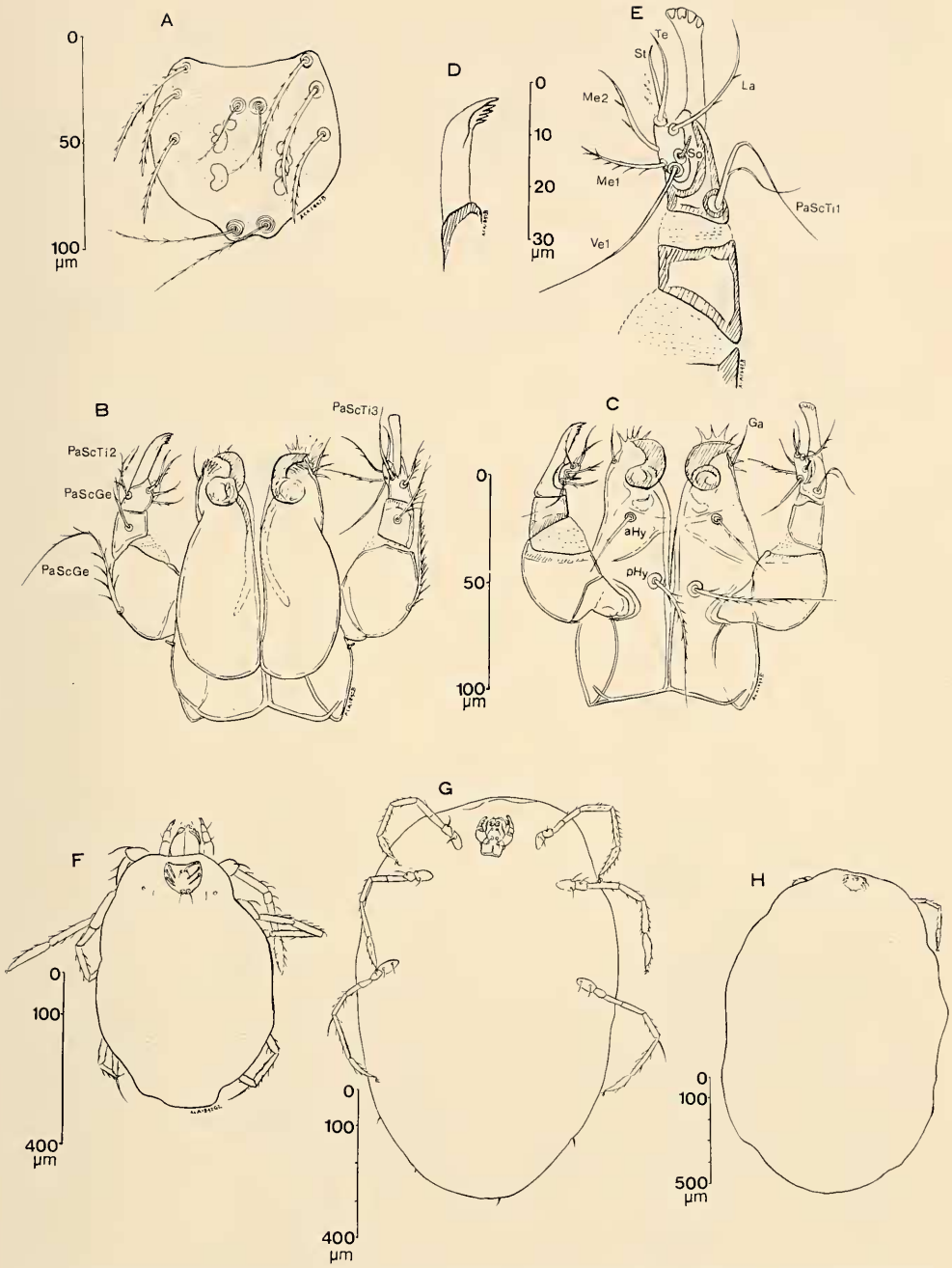


Fig. 4. Carastrum ferrari n. gen., n. sp., Larva. **A**, Dorsal scutum. **B**, Gnathosoma, dorsal view. **C**, Gnathosoma, ventral view. **D**, Palpal tibial claw, medial aspect, in dorsal view (see **B**). **E**, Tip of palp, ventral aspect (see **C**). (**A-E** from Paratype ACA1892B.) **F**, Holotype, dorsal view, in preservative before clearing. **G**, Large specimen, Paratype ACA1892C, after mounting, ventral aspect showing gnathosoma on ventral surface. **H**, Large specimen, dorsal aspect, in preservative, Paratype ACA1892G1, showing dorsal scutum retained in position at anterior pole of idiosoma. (All to nearest scale.)



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Gnathosoma robust, chelicerae rounded, width (combined) 71, length 91. Cheliceral fangs curved, with oblique terminal cutting edge. Gnathosomal lip fimbriated. Anterior hypostomala tapering, pointed, well setulose, 24; posterior similar, 66. Galeala slender, pointed, nude, 27.

Palpal setal formula 1, 1, 3, 7. Palpal femorala arises laterally, slender, pointed, setulose, 65; palpal genuala arises dorsally, similar, 40. Other palpal setae as figured. Palpal tibial claw broadened at end, to carry 4-5 small, pointed teeth. Palpal supracoxala a short blunted peg, 6 long.

Remarks on the type series

These larval mites were all partly fed. The smallest available, and hence most suitable for detailed description, was selected as the Holotype. Swelling of the idiosoma due to feeding in larger specimens obscures the characters of the gnathosoma.

Details of the sizes of the larvae (measured in ethanol, except A. B, which are estimated from the slide mounts) and host identifications are given in Table 2.

TABLE 2

Sizes and host Diptera identifications of Carastrum ferrari *n. gen., n. sp.*
H = *Helina* sp.; PT = *Pyrellia tasmaniae* Macquart (Muscidae). MF = unnamed calyptrate.

Mite number ACA1892	Length of mite	Width of mite	Fly number	Fly identification
A	ca 1500	ca 900	A2802	H
B	ca 600	ca 400	A2803	MF
C	990	610	A2804	PT
D	1585	1045	A2805	MF
E	1870	1280	A2806	H
F	1530	1115	A2807	H
G1	1600	1175	A2808	H
G2	585	415	A2808	H
H1	1100	650	A2809	H
H2	845	470	A2809	H

Remarks on biology

All of the mites were attached to the ventral surface of the fly, and all except one to the membrane connecting the metasternum and abdominal tergite I. In the two cases in which two mites attached to the host fly, in one the two mites were attached to the metasternum-abdominal tergite I membrane, and in the other case one mite was on this membrane, and the other on the prosternum. The largest of the larval mites (ACA1892E) equalled in size the abdomen of the host fly (see Fig. 5).

Mites of the tribe Callidosomatini have been recorded as larval ectoparasites of Lepidoptera (Womersley, 1934; Southcott, 1972; Treat, 1975, 1985; Sharma, Drooz and Treat, 1983; Sharma, Farrier and Drooz, 1983), Homoptera (Southcott, 1946, 1972) and Orthoptera (Southcott, 1961a, 1972). Although this is the first Australian record of Diptera being parasitized by members of the Callidosomatini, there is a previous record of one species, *Callidosoma tiki* Southcott, parasitizing an unidentified dipteran in New Zealand (Southcott, 1972), and mites referred to *Callidosoma* spp., but not further determined, have been recorded from Culicidae in North and Central America by Mullen (1975), Welbourn (1983) and Treat (1985), and from Trichoptera in North America by Resh and Haag (1974).

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H2	845	470	A2809	H

Remarks on biology

All of the mites were attached to the ventral surface of the fly, and all except one to the membrane connecting the metasternum and abdominal tergite I. In the two cases in which two mites attached to the host fly, in one the two mites were attached to the metasternum-abdominal tergite I membrane, and in the other case one mite was on this membrane, and the other on the prosternum. The largest of the larval mites (ACA1892E) equalled in size the abdomen of the host fly (see Fig. 5).

Mites of the tribe Callidosomatini have been recorded as larval ectoparasites of Lepidoptera (Womersley, 1934; Southcott, 1972; Treat, 1975, 1985; Sharma, Drooz and Treat, 1983; Sharma, Farrier and Drooz, 1983), Homoptera (Southcott, 1946, 1972) and Orthoptera (Southcott, 1961a, 1972). Although this is the first Australian record of Diptera being parasitized by members of the Callidosomatini, there is a previous record of one species, *Callidosoma tiki* Southcott, parasitizing an unidentified dipteran in New Zealand (Southcott, 1972), and mites referred to *Callidosoma* spp., but not further determined, have been recorded from Culicidae in North and Central America by Mullen (1975), Welbourn (1983) and Treat (1985), and from Trichoptera in North America by Resh and Haag (1974).

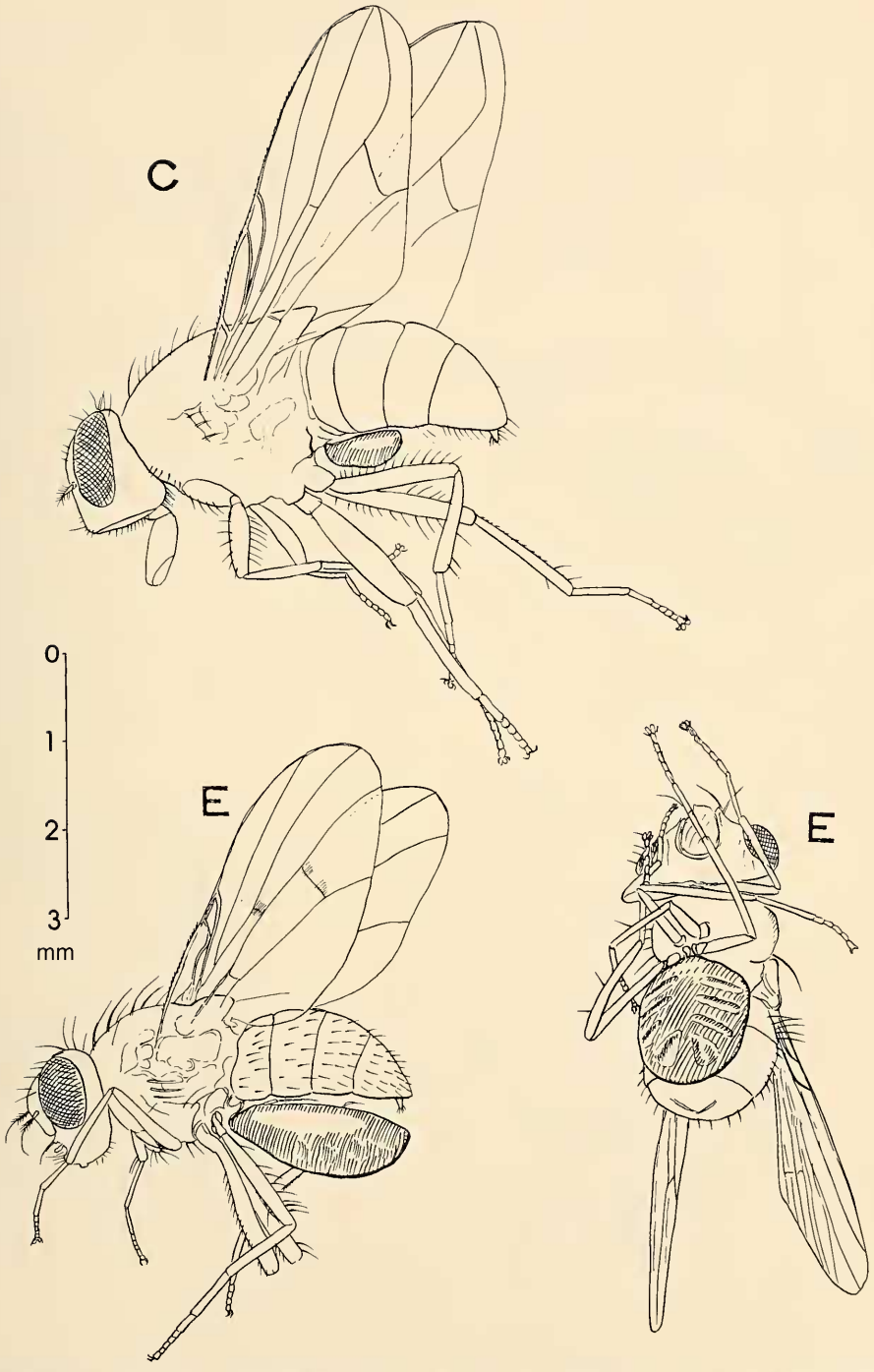
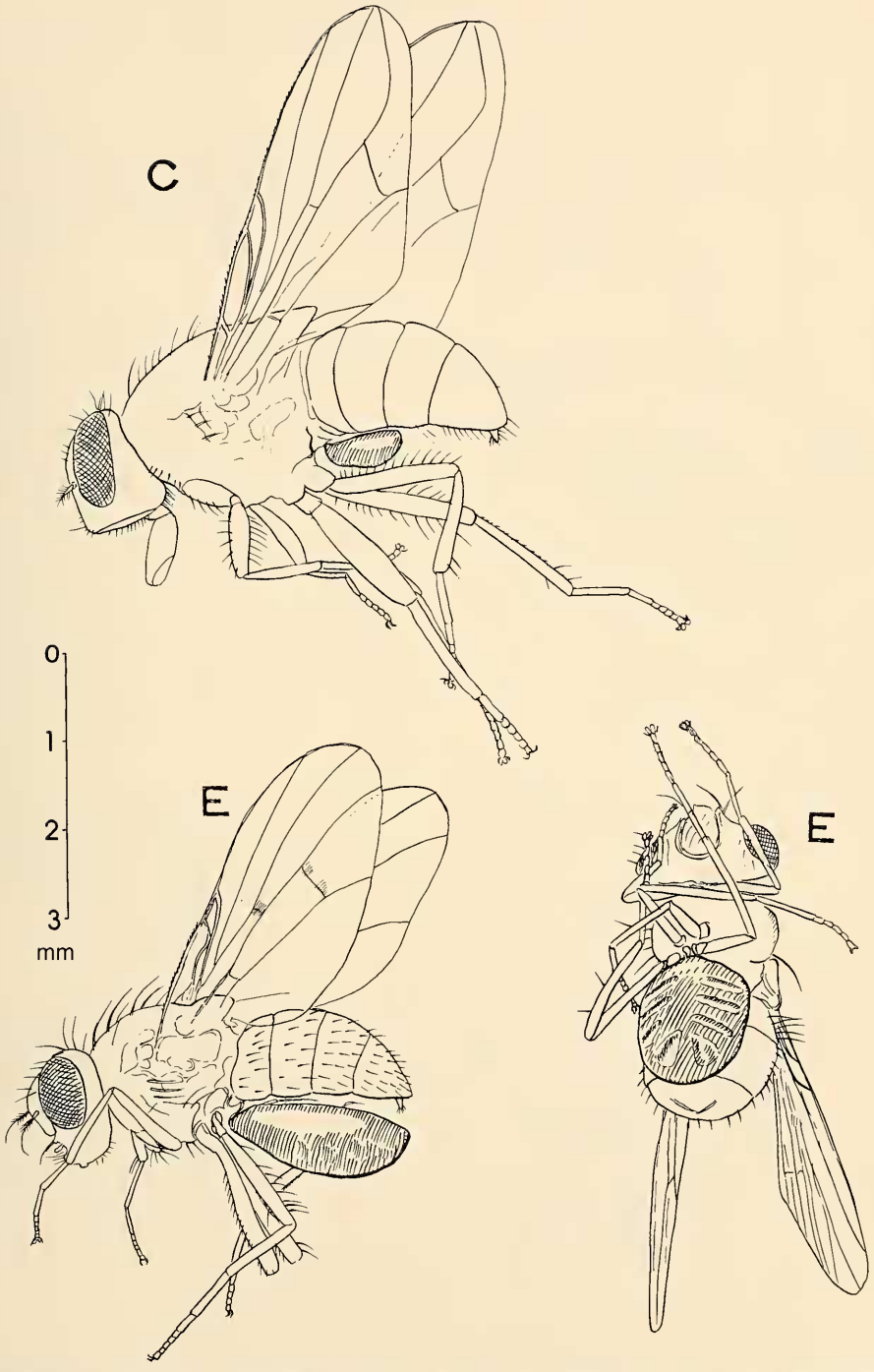


Fig. 5. Carastrum ferrari n. gen., n. sp., Larva. Mites as single parasites on host Diptera, Paratypes. **C**, Specimen ACA1892C on its host, *Pyrellia tasmaniae* Macquart, in lateral aspect. **E**, **E**, Lateral and ventral aspects of mite ACA1892E on its host fly (*Helina* sp.).



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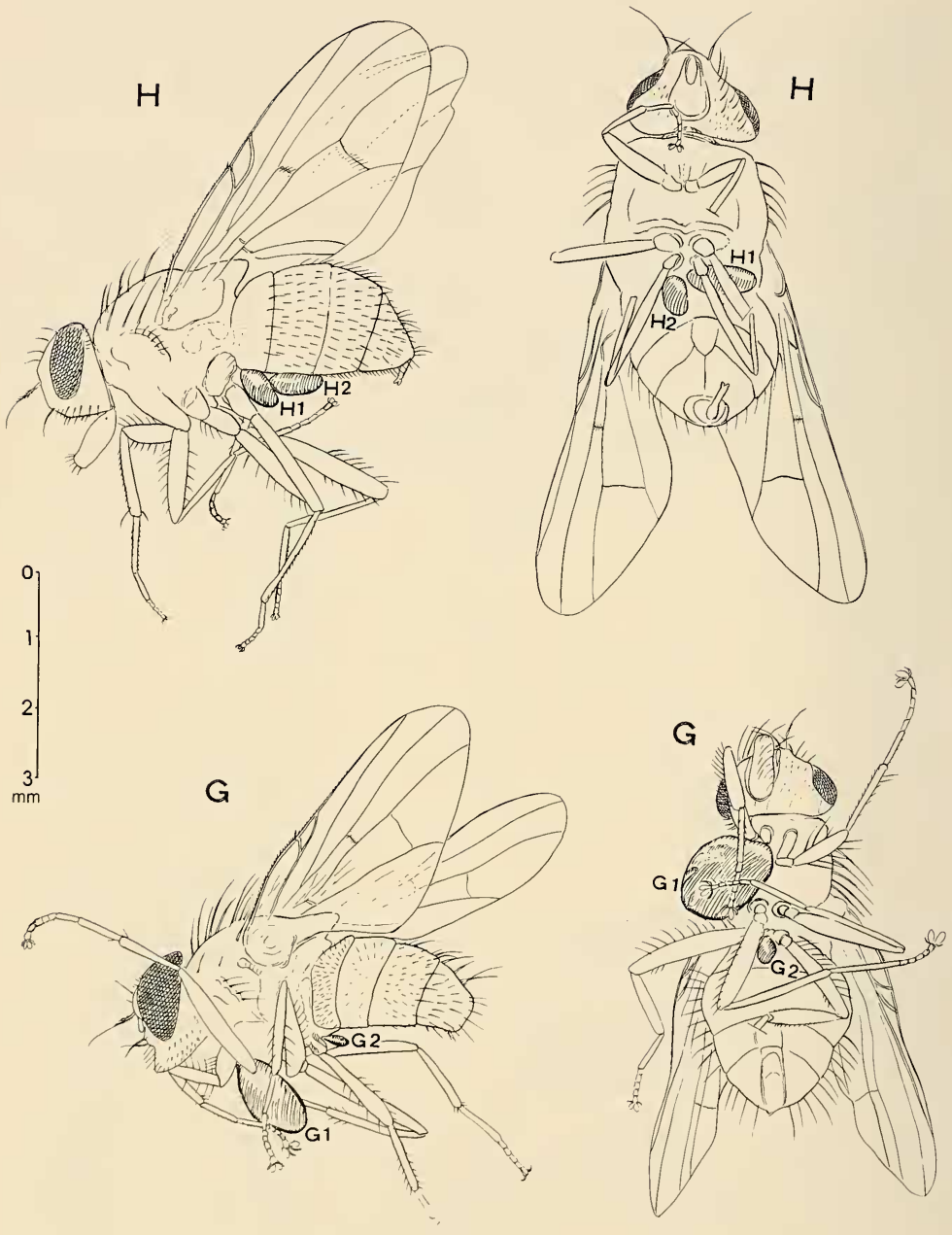

Fig. 6. Carastrum ferrari n. gen., n. sp., Larva. Host Diptera (*Helina* sp.) each with two mite ectoparasites. **H**, **H**, Lateral and ventral views of Paratypes ACA1892H1, H2 attached to metasternal-abdominal tergite I membrane. **G**, **G**, Lateral and ventral aspects of host fly with Holotype ACA1892G2 attached to metasternal-abdominal tergite I membrane, and with Paratype ACA1892G1 attached to prosternum.

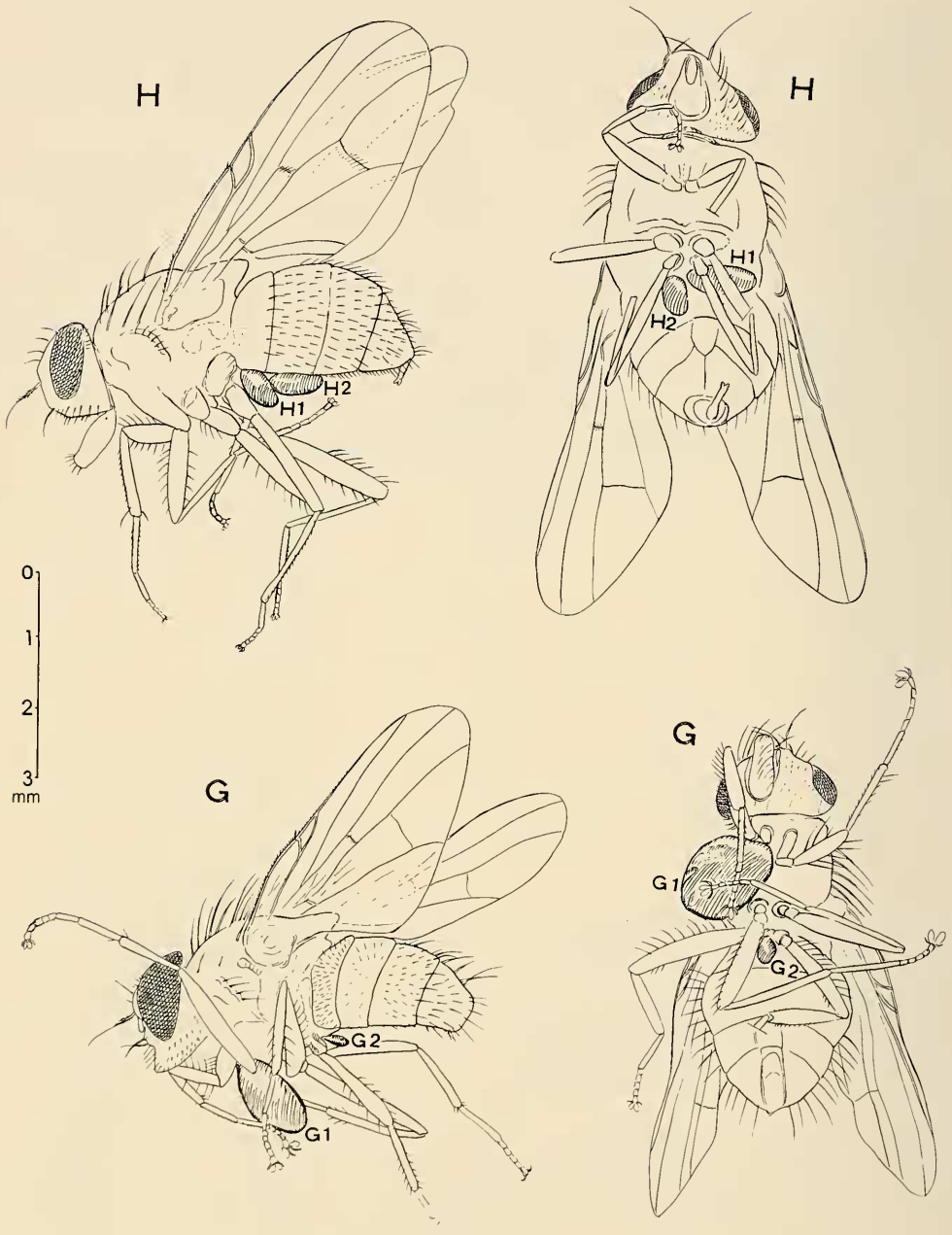

Fig. 6. Carastrum ferrari n. gen., n. sp., Larva. Host Diptera (*Helina* sp.) each with two mite ectoparasites. **H**, **H**, Lateral and ventral views of Paratypes ACA1892H1, H2 attached to metasternal-abdominal tergite I membrane. **G**, **G**, Lateral and ventral aspects of host fly with Holotype ACA1892G2 attached to metasternal-abdominal tergite I membrane, and with Paratype ACA1892G1 attached to prosternum.

Tribe CHARLETONIINI Southcott

This name was proposed in a key by Southcott (1961b, p. 522), but otherwise has not been formally defined. The following can now be submitted:

Definition

Adults: Callidosomatinae without distal tubercles on pedal tibiae.

Larvae: Callidosomatinae with scutalae 2+2 or 3+3. Pedocoxalae 1, 1, 1 or 2, 2, 2. Pedotrochanteralae 1, 1, 1 or 2, 2, 2. Posterior pedotibial claw hooklike or not. Palpal tibial claw (odontus) with or without accessory peg or basal process.

Type genus *Charletonia* Oudemans, 1910.

Comment: Adult Charletoniini can be separated from the Callidosomatini by a single criterion, i.e. by the absence of distal tubercles on pedal tibiae (see, however, some North American exceptions mentioned earlier). In the larvae so far allotted to the Charletoniini, only one genus has been experimentally correlated with its adult or deutonymphal instar, that being *Charletonia*, founded by Oudemans on 1 May 1910, and its post-larval instars being described under *Sphaerolophus* Berlese, founded on 1 July 1910. Correlations have been made by Ishii (in Southcott, 1961b, p. 528) and by Rosa and Flechtmann (1980) and Treat (1980). The other genera founded on larvae, *Hauptmannia* Oudemans, 1910, *Andrevella* Southcott, 1961, *Grandjeanella* Southcott, 1961 and *Pussardia* Southcott, 1961, may be tentatively allotted to the Charletoniini on present evidence. All of them come within the definition of Charletoniini as given above, and are excluded from the Callidosomatini as defined earlier in this paper. Further placements of these genera will probably need to depend on the evidence of experimental larva-postlarval instar correlations.

ACKNOWLEDGEMENTS

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